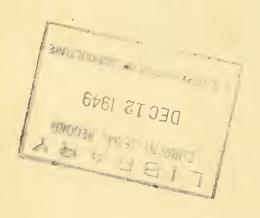
Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.



11 831 B

UNITED STATES DEPARTMENT OF AGRICULTURE AGRICULTURAL RESEARCH ADMINISTRATION BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

INSECT PEST SURVEY

12 2 2 300

Special Supplement (1949, No. 9)

Issued December 23, 1949

THE 1949 GREENBUG, OUTBREAK IN THE UNITED STATES AND CANADA 1/

Summary Compiled by the

Division of Cereal and Forage Insect Investigations

The greenbug (Toxoptera graminum, (Rond.)) appeared in unusual numbers in the north-central United States and southern Manitoba and Saskatchewan in Canada during June and early July of 1949. In some portions of that region it reached severe outbreak status and caused serious economic damage, especially to late-sown wheat, oats, and barley. Two other species of aphids, the apple grain aphid (Rhopalosiphum prunifoliae (Fitch)) and the English grain aphid (Macrosiphum granarium (Kby.)), were also generally present but of minor importance. The course, extent, and intensity of the infestation and the control measures tried, as given in replies to a questionnaire sent out to entomologists and others in the region affected, are summarized in this paper.

Apparently the most serious widespread infestation of the greenbug in 1949 covered the eastern two-thirds of North Dakota, the eastern half of South Dakota, the western half of Minnesota, a part of southwestern Manitoba, and a narrow strip in southeastern Saskatchewan. Although the greenbug has caused damage in North Dakota in the past, particularly to lateseeded grain, the 1949 outbreak was considered the most severe on record in that State. According to Munro and Davis, the value of the crops damaged and destroyed in North Dakota was several million dellars. Estimates from

I/ Prepared from information very generously contributed by the following individuals T. C. Allen, Madison, Wis.; A. P. Arnason, Saskatoon, Saskatchewan; R. D. Bird, Brandon, Manitoba; R.G. Dahms, Stillwater, Okla.; E.G. Davis, Minot, N.B.; J.J.Davis, Lafayette, Ind.; G.C.Decker, Urbana, Ill.; C.W. Farstad, Lethbridge, Alberta; F.A. Fenton, Stillwater, Okla.; G.I. Gilbertson, Brookings, S.D.; H.M. Harris, Ames, Ia.; L. Haseman, Columbia, Mo.; E. Hixson, Lincoln, Neb.; H. G. Johnston, College Station, Tex.; C.B. Kelsey, Pierre, S. D.; J. McConnon, Winona, Minn.; H.M. McDonald, Saskatoon, Saskatchewan; C.F. Manson, Lethbridge, Alberta; C.E. Mickel, St. Paul, Minn.; J.A. Munro, Fargo, N.D.; J.H. Pepper, Bozeman, Mont.; R.E. Pfadt, Laramie, Wyo.; W.M. Rogoff, Brookings, S.D.; H.L. Seamans, Ottawa, Ont.; H.C. Severin, Brookings, S.D.; R.C. Smith, Manhattan, Kans.; and R.J. Walstrom, Lincoln, Nebr.

^{2/} Munro, J.A., and Davis, E.G., Greenbug Outbreak in 1949. N. D. Agr. Expt. Sta. Bimonthly Bul. 12 (1): 1-10. 1949.

South Dakota indicated that about $2\frac{1}{2}$ million acres of cereal crops, oats, barley, and wheat were infested in varying degree in the central and eastern part of the State, some of the most severe damage occurring in latesown oats, and 50,000 to 60,000 acres of late-sown grains completely ruined. A moderately heavy infestation in wheat, barley, and oats was noted over the western half of Minnesota, and a lighter infestation extended as far east as St. Paul. It was reported that about 100,000 of 150,000 acres of late-seeded oats and barley in southwestern Manitoba were destroyed by the greenbug, and that some spotted infestations were observed throughout the southern part of the province. The outbreak in southeastern Saskatchewan covered a strip approximately 12 to 18 miles wide and 100 miles long representing a westward extension of the infestation in Manitoba. Serious damage in Saskatchewan was confined mostly to late-seeded oats and barley.

The greenbug apparently has been increasingly abundant in small grains in Wisconsin during the last 3 years, and high infestation, especially in oats, was reported in 19 counties in the northwestern part of the State in 1949. No greenbug infestation was reported from Illinois and Indiana, but the English grain aphid was present on heads of wheat in scattered localities in Indiana and central Illinois. The greenbug was generally present in oats in southwestern Iowa and spotted in the central part of the State. The loss in Iowa was estimated at 1 percent on 5,000 to 10,000 acres of oats, and complete destruction of one small field was noted. In the eastern two-thirds of Nebraska, wheat, barley and oats were reported as damaged from 10 to 25 percent, principally by the greenbug, although the apple grain aphid was also present. In Kansas the greenbug was widely distributed but caused destruction only to some fields of oats in several of the northern counties. It is believed to have migrated into that State from the south in late May and early June. Infestations in Oklahoma were local and light on winter wheat during November and December 1948 and in the spring of 1949. They increased somewhat during May but too late to cause much injury. Some damage to late-maturing oats and spring barley in May was reported from four counties in the north-central part of the State. The greenbug apparently caused little or no damage in Missouri, Wyoming, or Montana, or in Alberta, Canada, in 1949. One field of barley in Wyoming was reported to have had a heavy infestation.

Although an accurate estimate of the losses caused by this outbreak is not possible, the total damage undoubtedly amounted to several million dollars. The magnitude of the losses is perhaps indicated by the fact that some 60,000 acres of small grains were sprayed to control this pest, and that this acreage was undoubtedly only a small portion of the total that needed protection.

Infestations of the greenbug in 1949 became noticeable during the first week or two of June in North Dakota, South Dakota, Minnesota, and Wisconsin, and populations of the insect built up to a peak or maximum strength in late June or early July. Farther north, in Manitoba and Saskatchewan, the aphid appeared in numbers a little later and reached a peak of abundance from early to middle July. In States more to the south the insect developed somewhat earlier. After reaching its peak in any particular area, the outbreak usually subsided in about 10 days to 2 weeks.

Extremes of weather were undoubtedly important influences in the incipience, development, and termination of the 1949 greenbug outbreak. Mild temperatures in the winter of 1948-49 and a cool spring in 1949 were favorable to survival and propagation of the species in parts of its more southern environment, and similar conditions to the north may have increased the carry-over of adult aphids. As usual, the greenbug apparently migrated northward as the spring advanced, and its spread was hastened by heavy flights. The spring weather favorable to the greenbug was also conducive to satisfactory growth of late-seeded small grains on which the aphids could best survive, but probably was unfavorable to the early development of its predators and parasites. Such conditions permitted the aphid to become well established and to reach destructive proportions before its ultimate control by natural factors.

The termination of the outbreak was attributed by various observers to the effects of hot weather, hot dry winds, drought, heavy rains, reduced succulence of plant growth, and a reduction of the greenbug populations by an increased prevalence of insect predators such as the larvae and adults of ladybeetles and the larvae of lacewings and syrphid flies. Hymenopterous parasites also destroyed a certain proportion of the aphids, and entomophagous fungi were reported to be present in several localities. However, these natural control factors were often not effective until after irreparable damage had been caused to the grain crop by the greenbug. Drought, diseases, nitrogen deficiency, poor germination, and other factors reduced small-grain crops in some areas, and the degree to which these agencies rather than the aphids were responsible for the damage could not be definitely determined.

Insecticides were used as a control measure in several of the most heavily infested areas. In North Dakota excellent kills were obtained with commercial oil-water emulsions of parathion or tetraethyl pyrophosphate (TEPP) applied by airplane. The emulsion concentrates used contained 16 percent of parathion or 20 percent of tetraethyl pyrophosphate. They were applied at the rate of $l\frac{1}{2}$ pints of the concentrate per acre mixed with water to make 2 gallons of spray solution. Nicotine sulfate, toxaphene, and benzene hexachloride were reported as less efficient than parathion and tetraethyl pyrophosphate. About 40,000 acres of grain were sprayed for control of the greenbug in North Dakota in 1949.

In South Dakota an estimated 10,000 acres of grain crops were treated, mostly from the air. A 16-percent parathion emulsion applied by airplane gave the best control. Poorer results were reported with tetraethyl pyrophosphate, benzene hexachloride, chlordane, toxaphene, and DDT. Good control (better than 98 percent) has obtained in Manitoba with a 15-percent parathion wettable powder applied at the rate of 3/4 pound per acre, with a boom sprayer. Benefit from the control operations in Canada was lessened, however, because treatments were delayed until many of the crops were beyond saving. Nicotine sulfate and benzene hexachloride were reported as not successful.

A parathion emulsifiable solution at $l\frac{1}{2}$ pints in 5 gallons of water per acre was used in the treatment by airplane of 8,000 to 9,000 acres of grain in Wisconsin. It was estimated that from 75 to 100 percent of the aprayed acreage in the State was saved from destruction by the greenbug.

All the insecticidal treatments were more or less experimental, and the account given above does not constitute a recommendation of any of them. In many cases the insecticides were applied too late for a satisfactory evaluation of their effectiveness in controlling the greenbug. Observations of the 1949 and previous outbreaks indicate the need of early recognition of potentially dangerous numbers of the insect in the field if insecticidal control measures are to be applied in time to obtain material benefit.